Inquiry into 21st century learning environments and digital literacy

Report of the Education and Science Committee

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Inquiry in 21st century learning environments and digital literacy

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- That it develop an improved research framework to ensure that educational policies are informed by current research thinking and future-focused thinking in the digital area. In developing the research framework, adequate consideration should be given to ensuring that New Zealand research is shared throughout the country and with international research programmes. (p. 17)

- That it consider whether it commissions an iterative best-evidence synthesis of digital learning and pedagogies. (p. 17)

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- That it consider whether the Network for Learning should be accessible not just from schools' premises. (p. 37)

- That it consider how Network for Learning Ltd can provide affordable access to high-speed Internet connections with unlimited data to all schools. (p. 37)

- That it consider the benefits of implementing and operating a single system for core ICT services in schools, including identity and access management, a student management system, a learning management system, e-portfolio, e-asTTle and e-Admin systems such as ENROL. (p. 37)

- That it consider whether access to high-speed Internet and core ICT services should be funded nationally. (p. 37)

- That it recognise that 21st century learning will require significant change across the education sector, involving a wide range of stakeholders; and that the Government recognise achieving such a change needs government- and sector-wide leadership to develop and promote a vision, and to lead an integrated series of work programmes to implement that vision. (p. 39)

- That it consider reviewing the best institutional arrangements for providing the leadership to deliver both digital capability and 21st century learning environments. This review should include options such as, but not limited to, strengthening the Ministry of Education, extending the responsibility of Network for Learning Ltd, or establishing a new Crown entity. (p. 39)

- That it consider that the Education Review Office report on the digital capability of schools in its regular school reviews. (p. 41)

- That it consider that the Education Review Office reports include information on how well schools collaborate with other schools. (p. 41)

- That it seek input from the sector on barriers to collaboration, and then modify policy, funding, and operational processes to actively promote collaboration. (p. 41)

- That it review student assessment to ensure that more online assessment opportunities are realised. (p. 41)

- That it consider possible regulations regarding the use of school buildings to support the use of digital facilities by the community. (p. 41)

- That it assess the possible resource implications of our recommendations for ICT expenditure. (p. 41)

- That it assess possible legislative changes in response to the recommendations in this report. (p. 41)

1   Context

We are aware that the education sector is changing significantly as a result of new technologies and access to the Internet. This is an area of rapid change. We considered it necessary to examine the full implications of this rapid development for our education sector, and so resolved to initiate this inquiry. In this report, we use the term "21st century learning" to mean the changes to teaching and learning in schools that result from digital technology. However we acknowledge that many of our recommendations may be applicable beyond schools, in the wider education sector.

The term "learning environment" suggests traditional places of learning such as schools, classrooms, or libraries. However, while much of 21st century learning takes place in dedicated physical locations, in today's technology-driven world a learning environment can also be virtual, online, or remote.

The purpose of this inquiry is to investigate and to make recommendations on the best structures, tools, and communities, in both rural and urban New Zealand, for enabling students and educators to attain the knowledge and skills, such as digital literacy, that the 21st century demands of us all.

The terms of reference for the inquiry are as follows:

- Investigate possible options for the best facilities that support teaching and learning in 21st century schools; in particular, investigate more flexible teaching spaces.

- Investigate possible changes to the timing of when learning can occur, given the spread of handheld devices.

- Investigate possible options for the best technological infrastructure that supports teaching and learning in 21st century schools.

- Consider how the rollout of ultra-fast broadband (UFB) will affect teaching techniques and processes, and whether additional resources or training may further enhance the positive effect of UFB on teaching and learning outcomes. In particular, investigate the role and efficiency of the Network for Learning.

- Consider whether current generations of learners more readily adopt new technology, and whether increasing base levels of technological proficiency may promote independent learning.

- Investigate the opportunities for technology to increase collaboration between neighbouring schools, and between distance learners.

- Investigate issues of equity of access to technology in New Zealand schools, which includes establishing the current extent of New Zealand's digital divide.

- Investigate the impact of increased digital literacy on learning.

We received 90 submissions, and considered advice from the Ministry of Education and the Ministry of Business, Innovation and Employment, and from a specialist advisor, Laurence Millar.

Defining digital literacy

Within the broad areas of student competence there was discussion on digital literacy. There was substantial support for viewing digital literacy as more than just technical competence. One submitter recommended that the definition of digital literacy should be aligned to the skills that will equip the New Zealand workforce of the future. We are also aware that some definitions refer to three skill sets that individuals need to master in order to be digitally literate. To achieve Information, Media, and Technology Skills, the theory is that a person needs to achieve competency in these areas. We acknowledge that while there may be differing definitions of digital literacy, the basic premise is that students will be able to come through our education system with an ability to navigate new technologies, and have the skills that are required of them in the modern world.

We are also aware of a wider term used by some of "digital citizenship". Drawing from the Key Competencies and Values in the New Zealand Curriculum and a growing body of research knowledge, NetSafe in consultation with some New Zealand teachers has produced a definition of a New Zealand digital citizen. NetSafe advocates that digital literacy or the ability to understand and fully participate in the digital world is fundamental to digital citizenship. It is the combination of technical and social skills that enable a person to be successful and safe in the information age.

NetSafe also proposes that just like literacy and numeracy initiatives, which provide people with the skills to participate in the work force, digital literacy has become an essential skill to be a confident, connected, and actively involved lifelong learner. In chapter 6 we set out recommendations for the development of digital literacy and 21st century skills.

Past and current initiatives

The Government and the Ministry of Education have supported the move towards better use of digital technologies in education since the 1980s. Strategy documents include *Interactive Education* (1988), *Digital Horizons* (2003), and *Enabling the 21st Century Learner: An e-Learning Action Plan for Schools 2006–2010* (2006). The *New Zealand Curriculum* (2007) emphasises the importance of e-learning and pedagogy (p. 36 of the *New Zealand Curriculum*).

In the area of technological capability, Project PROBE brought the first broadband access to almost all schools in 2003, and research showed the distribution of laptops for principals and teachers through the TELA scheme at a similar time provided a substantial change in the use of information and communication technology (ICT) in schools. We are aware that there has been some interest from Australian parliamentarians and officials regarding our rural broadband rollout and our investment in e-learning, the Virtual Learning Network, the Virtual Kura project, and particularly in building teacher capability.

We had advice from the Ministry of Business, Innovation and Employment that the Government is investing $1.5 billion in ultra-fast broadband. We had advice that the Government's target is for 97.7 percent of schools and 99.9 percent of students to have

access to ultra-fast broadband. We heard from the Ministry of Education that it is ensuring (in partnership with the Ministry of Business, Innovation and Employment and Crown Fibre Holdings) that all schools will be connected to fibre or an alternative technology by 2016, and that over the next few years all schools will have completed internal network upgrades. We heard that the government has invested in Network for Learning Ltd, and its aim is to ensure all schools have access to affordable, safe, reliable, ultra-fast connectivity and content and services from 2013, to enhance school administration and student learning outcomes.

Articulating a 21st century vision

Throughout the submissions, we were presented with a clear consensus on the potential features of the New Zealand education sector in the future. We heard there could be enhanced personalised learning, rather than a one-size-fits-all approach, allowing learners to proceed at their own pace. This could allow more student-led inquiry, where students have more control over their learning, and allow them to focus on their own interests, with support from teachers. In such an environment, we heard that digital literacy would be an essential skill to enable and enhance both teaching and learning.

We heard that the current education system does not always meet the individual needs of students. Using the Internet, each student can learn in a more personalised way, and access information in a way that reflects their individual learning needs and style. A number of student submitters said that they valued the individual learning that their schools offer, which is made possible by the use of Internet-sourced resources. We believe major changes in the way students learn are inevitable, and it is essential that the Ministry of Education and teachers be responsive to the shift. We also heard that parents would have more opportunities to be involved in their children's education, and that their own digital literacy could be enhanced and supported by their children.

We understand that there are many schools that have developed positive 21st century learning environments. We heard of education networks, loops, and clusters throughout New Zealand that are at the cutting edge of best practice. Innovation is happening in urban and rural areas, and students from higher and lower income backgrounds are benefitting. Students and teachers from these communities made enthusiastic submissions to the inquiry, and were confident that the rest of the education sector could benefit from some of their innovations. In particular, we were impressed with the school students who submitted to our select committee from Amesbury School, Tawa Intermediate, and the Computer Clubhouse Trust. We were encouraged by their depth of understanding and their desire for e-learning.

Fostering innovation and collaboration

More innovations are needed beyond the existing community of education enthusiasts and clusters. The networks and loops in question do not just connect schools within a local area. Some of the most innovative uses of the connections between schools involve using networks and loops to allow teachers to collaborate around the country, and to reach more students in a targeted way. For example, we heard from a submitter who leads a regular digital discussion group with the teachers who have been tasked with leading innovation and development in their schools towards a 21st century learning environment. Another submitter had founded a voluntary group of biology teachers, which holds regular

discussions of methods that they have used successfully with their students. This subject teacher example is particularly interesting, as it shows leadership by teachers as well as an innovative approach to professional development. These teachers are using the resources available to them to collaborate with their fellow teachers, and to share their innovations so that their students are receiving the best education in biology that the combined group of teachers can offer.

We heard from several submitters about the Manaiakalani project, which has been operating for 19 years. One submitter specifically said that the project succeeds because of leadership, time, and dedication. Another submitter said that before the Manaiakalani cluster proved it possible, he would not have believed that a school could install wi-fi for its community, support the provision of devices for their students, and lift educational outcomes without leaving the school in debt. The Manaiakalani cluster of schools submitted that their students are making exceptional progress.

Evaluation of best practice and research

Throughout this report, there is much reference to anecdotal evidence. We heard there is a lack of research in the area of education. That is why we have recommended that the Government consider improving the research framework to ensure that educational policies are informed by current research thinking and future-focused thinking in the digital area. In considering the research framework, adequate consideration should be given to ensuring that New Zealand research is shared throughout the country and with international research programmes. We believe that one of the most important steps that the Ministry of Education can take to improve learning in New Zealand is to invest more in pedagogic research; other ministries could conduct neuro-biological research. Sir Peter Gluckman noted that we are entering an age of technological change and have little idea of what impact this will have on brain development. The pace of technological development is such that teaching and learning approaches are going to need to be much more flexible to respond to these and future changes.

We heard from one submitter that educational research is poorly funded, particularly compared with economic research, and that there is a lack of professional assessment of the quality and the impact of programmes in New Zealand.

Addressing equity issues

The learning and teaching environment needs to support more involvement of family and whānau in the education of their children. Throughout our hearings, we heard examples of inequity between rural and urban communities, between and within schools, in access to devices, and resulting from the variable digital literacy of individuals. We heard that both the home and the school environment affect students' ability to become digitally literate. In chapter 7, these issues are outlined and we have proposed recommendations.

We recognise that buildings and classroom design in many schools reflect a 20th century model. Many submitters described their desire for a more innovative and flexible physical environment for teaching and learning.

Submitters repeatedly told us that they would like to see changes to further enhance the education system to better reflect 21st century learning, skills, and competencies. The

current system (legislation, policy, leadership, and measurement) can be seen as a barrier by schools, principals, and teachers who are achieving 21st century learning; the system needs to change to support the vision, and create incentives to realise it.

The future of learning and teaching

We heard that changes in the methods of teaching are being driven largely by students. The increasing access that students have to online and blended learning has provided them with a more diverse range of sources of information and enhanced inquiry learning.

We heard that there may be better opportunities for certain areas of the school system such as teaching in isolated areas or the provision of tuition in languages. We heard that there will also be more opportunities for students to access content from around the world, or a teacher in another New Zealand location.

There is a need to up-skill current teachers to offer such new ways of learning. We heard that this could require big changes to the professional learning and development that are available to teachers, as well as initial teacher training, and this will be discussed in detail in chapter 4. We heard from a number of different submitters about possible models to deliver teacher support and professional development.

In order for teachers to facilitate digital literacy, they must themselves be digitally literate. Teachers who do not embrace e-learning are at risk of not being able to maximise learning opportunities for their students. Inconsistent policies in the device policy area have the potential to establish a digital divide within schools.

We believe that the future of learning will be blended; students will combine learning from on-line and video technology with group work and individual study. The skills of a teacher will need to reflect this new blended learning environment.

We received a number of submissions urging us to ensure that the needs of students with disability are considered. We also heard of one school that redesigned a classroom around the needs of a disabled student. We were interested to hear that the school found that all students benefitted from the redesigned classroom. We recognise that under the current education system, disabled students can be marginalised, and we must ensure such students are accommodated in planning for education.

We heard that progress has been made by some individual schools in adopting new methods of teaching. Schools throughout the country have begun to collaborate more by creating networks. The move to networking of schools was motivated in part by a recognition that this approach can help address the challenges that face small schools, especially rural schools. We feel that there is an opportunity for schools to learn from the experience of others that have developed virtual networks.

Potential barriers to progress

New Zealand can boast examples of exceptional 21st century learning in the digital environment. The biggest challenge the New Zealand education system faces is scaling these successes so that every school uses digital devices and access to Internet content and services to maximise learning opportunities. While we heard many submissions describing individual success stories, we would like to have been presented with research that analyses

the common characteristics of these successes. However, we acknowledge in chapter 2 that there is a lack of research focussed in this area both in New Zealand and overseas.

We heard that a major factor in the success of a school is leadership. Leadership within schools is offered by principals, individual teachers, and boards of trustees. We heard from a number of teachers who had established leadership roles to progress 21st century learning. We heard that there are opportunities for teachers to become online leaders, via access to the Internet, for example by hosting a discussion forum on their particular subject. We heard from the leader of a "digital citizenship group" of teachers from a range of schools throughout the country, who regularly conference call to collaborate and share ideas about what is working for them. This group shows what can be achieved. We recognise what can be achieved by the leadership of dedicated educational professionals, and in chapter 11, we propose initiatives to support them more.

We heard from some rural schools that geographical location is preventing them from giving their students the best learning experience. Teachers in these schools cannot help their students reap the full benefits of individual and collaborative learning methods based on Internet-sourced content for lack of high-speed Internet access. A number of submitters to the inquiry also said that wireless access throughout schools is an important asset for learning. If students and teachers are to be encouraged to source information from the Internet, then they must be able to access the content quickly and efficiently. The issue of the availability of technology is covered in detail in chapter 7.

Another barrier to teachers realising the full potential of blended learning using digital devices is the time needed to master the new technology, according to submitters. A high percentage of current teachers were not taught skills in information and communication technology when they were at teachers' college. These teachers are required to find the time to take professional development courses to gain the necessary skills. Submitters suggested that changes are needed to the way that professional development is run, so that these issues can be tackled. Again, this will be addressed in chapter 4.

We heard from teachers who are leading their schools in digital literacy about how they use a wide range of tools in communicating with their students. Their students can learn at a time that best suits them, and we heard of examples of teachers seeing their primary-school-aged students uploading documents late at night. Teachers may then feel they are expected to facilitate learning at the time which best suits the student. When the school day is over, instead of being able to prepare for the next day, teachers now find themselves communicating with students, and continuing to help them learn.

Teachers who made submissions to the inquiry were asked how they maintained a work–life balance, and many replied that they find it difficult. If technology is designed to make the teachers available more often, teachers' work–life balance issues should be considered.

Throughout this inquiry we have been aware of the rapidly changing environment, and the need for greater data and research. For this reason we have taken an approach throughout the report whereby we have endeavoured to identify the challenges and emerging trends, then we have identified key work streams that the Government should consider as a result of those issues and challenges.

We are pleased that we have been able to present a substantive report with significant cross-party agreement by the four political parties on this committee.

2   Improving data and research to create an evidence base

We understand that the area of digital literacy is an emerging policy area in education. One of the challenges that we had in this inquiry was that there were certain areas where there was a lack of data and research to inform our inquiry. However, we do believe that we have been able to identify throughout this report some policy issues that need addressing and some general areas of work. In each area we have been careful to examine the available evidence base for our recommendations.

We are encouraged that the Ministry of Education recognises that 21st century learning requires many technology components to be in place in schools including fibre Internet connection, in-school networks, equipment, schools software and hardware (including computers, laptops, tablets, printers, and other "end-user devices"), as well as the content and services used for teaching and learning. We asked questions about the presence and use of technology in schools. While we understand this is still an emerging area around the world, we believe it is crucial that government agencies are able to provide more comprehensive data in the future. For example, we were provided with data on which schools had access to fibre, but not on which schools were making use of the fibre for teaching and learning purposes. This reflects a particular point in time in the deployment of fibre to schools.

We also received advice about schools that had received an internal network upgrade, but not whether these schools had access to fibre. Other examples of areas where we would have liked more comprehensive information were the extent to which wi-fi access was used in schools, the adequacy of technical support, the variety of policies on devices in schools, the use of school ICT facilities by the community, access to ICT by students outside school (for example in the home), the software in use in schools, the extent of e-learning and the use of digital content resources by students, and the ICT capacity and capability of teachers in schools. There does not appear to be a sector-wide view of the digital state of each school. We understand that under current policy settings in the sector, operational decisions are made by individual boards of trustees; however, we consider that the absence of a comprehensive integrated view of the digital readiness of all schools makes it difficult to plan for 21st century learning. We consider it important that there be robust nation-wide data on the use of ICT in schools to enable sector-wide planning for 21st century learning.

Many submitters suggested that more research is needed into the impact of digital technology on teaching and learning and the resultant outcomes. One area of research raised by Sir Peter Gluckman was the relationship between digital technology and neuro-biology. In his submission, Sir Peter Gluckman noted that current research on the relationship between technology and learning is inconclusive. In his submission, he noted that some studies show that technology-based training can improve working memory and provide mental stimulation, but some applications can be a distraction, and parental

monitoring of younger students' use of technology may improve learning outcomes. He also submitted that research into the risks and potential benefits for healthy development presented by new technologies will enable educational professionals and parents to access clearer independent information.

We heard from a submitter that they believe that educational research is poorly funded compared with economic research. We heard that research is being conducted by post-graduate students in New Zealand into the role of the "e-principal", blended learning, and initial teacher education, and we believe that such research will be invaluable for the development of 21st century learning environments.

We accept that one major reason that the research is limited is because this is an emerging policy area. We feel the need for a sense of urgency to ensure there is better data and research as more schools are using more technology and shifting towards a 21st century learning environment.

Research identified as necessary by submitters included the relationship between digital learning and blended learning, improving collaboration, pedagogy of digital learning, distributed leadership, teacher development, the impact of ICT on children's development, universal design and impact on learning outcomes, and digital equity. We feel that it is important that any research undertaken in this area should be publicly available. We heard that in other areas of education a process is undertaken by the ministry called an iterative best-evidence synthesis which results in a comprehensive review of current research in an area, to inform what works best for student learning outcomes.

Recommendations

1.   We recommend that the Government implement a system that collects, analyses, and disseminates better sector-wide data on digital literacy and 21st century skills to enable more evidence-based policy decisions.

2.   We recommend that the Government develop an improved research framework to ensure that educational policies are informed by current research thinking and future-focused thinking in the digital area. In developing the research framework, adequate consideration should be given to ensuring that New Zealand research is shared throughout the country and with international research programmes.

3.   We recommend that the Government consider whether it commissions an iterative best-evidence synthesis of digital learning and pedagogies.

3   21st century school buildings and learning hubs

A key issue in providing a 21st century learning environment is ensuring that schools have the right facilities to support teaching and learning. We heard consistently from teachers and students that the single-cell learning spaces of traditional classrooms of the last 100 years do not always meet the needs of learners. We also heard from many submitters that having desks arranged in rows, even if they are now facing an electronic whiteboard, does not maximise the opportunities of learners.

We heard that students are increasingly learning in groups, and in collaborative ways. We heard that some new schools, such as Albany High School in Auckland, and Amesbury School in Wellington, have been designed in an innovative way to accommodate modern learning environments. We understand that many schools are balancing the need to develop more modern environments with current upgrades. We hope that for any new builds consideration is being made to ensure a more modern learning environment results.

We were delighted to hear from teachers who had used a small amount of money and a lot of creativity and determination to transform their old classrooms into learning spaces to better reflect the needs of their students. These new spaces allow students to find the space that best suits their learning needs; if they are working on a collaborative project, they can use one of the larger tables, and if they want to work on an individual project, they can decide whether they would prefer to sit at a desk. We heard that some schools are moving away from "computer labs" to a policy of placing computers in every classroom. Increasing variety and uptake of devices coupled with wireless access could enable students to better determine the space that works best for them.

We heard flexibility of 21st century learning environments was seen as the opportunity for learners to engage in a much wider range of learning activities and situations than possible in a conventional classroom.

We heard that teachers can also benefit from learning in open spaces. We heard from some submitters who work in new school environments that the open spaces can facilitate better cooperation amongst teachers. Albany Senior High School has open space classrooms. We heard that less experienced teachers are often scheduled to teach classes next to classes being led by senior teachers. This allows them to observe the senior teachers, and pick up tips that they can immediately test themselves; so teachers can collaborate more freely, and see the results much sooner. We heard that they believe that this approach is beneficial for all students.

One submitter stated that a flexible physical environment does not support 21st century learning without the right kind of teachers, the right kind of relationships, the right kind of

pedagogy, a broad toolkit of teaching and learning tools, and flexible timetables to allow for personalised learning.

While there are obvious benefits from a better physical environment, there are many existing schools that were built decades ago, and have not been adapted for 21st century learning. We think access to more open, flexible, networked learning environments should be considered, not just in the context of a new rebuild, but also how we convert existing environments. We heard from a number of submitters the benefit of access to wi-fi in more modern learning environments. This is discussed further in chapter 9. When schools cannot offer wi-fi, the students seek out places that do; we heard of students connecting to the wi-fi network offered by a nearby McDonalds.

We heard that some schools act as learning hubs for their whole communities. One way to create an effective hub is to make the school facilities available to the community to use when school has finished for the day. Another option could be to open up the school library to the community. Submitters noted that some schools have set up "parents' computer rooms", where parents can use the school's computers away from students. Other schools have placed computers in the school lobby for use by parents. There are a range of models currently happening around New Zealand, and they need to be considered both in terms of the benefit for children's learning, and in terms of access to resources.

We heard from some submitters that there can be practical issues when trying to set up a school as a digital hub. One school took two years to complete all the required policy changes so that the community could use the school library when the school day ends. We heard from submitters that legislation and schools' insurance policies are barriers to allowing non-students to use the facilities except in certain circumstances. We heard that the Manaiakalani cluster formed a trust to allow the community access to their school facilities, which provided an easier mechanism than to change their insurance policy and seek exemptions under the Education Act 1989.

We heard that there is a large variance across the country in the role of school libraries. Some schools have invested significant resource and time in ensuring their libraries are an integral part of 21st century learning. One factor that could be taken into account is the possible difference in role between rural and urban school libraries. We believe there needs to be greater consideration of their role.

Recommendations

4.   We recommend that the Government investigate the benefits and implications, along with any policy or legislative changes, of extending availability of school facilities and resources, including computer labs and Internet connections, to their communities.

5.   We recommend that the Government create best-practice design templates for school buildings so that newly-built schools and upgrades are more open, flexible, and networked.

6.   We recommend that the Government consider how school libraries can be 21st century learning environments.

7.   We recommend that the Government consider encouraging local government to ensure greater Internet access via public libraries for out-of-school learning as a valuable community resource.

4   Training and professional development

When considering the skills, knowledge, and understanding that will be required of a future teacher, it is important that the approach is open-minded. We understand that technology is rapidly changing, and so the skills required of a teacher cannot be fully anticipated. In assessing the role of the teacher, the changing environment needs to be taken into account. Some submitters have proposed skills that may be more appropriate in the 21st century. The Government has a significant interest and role in ensuring teachers are equipped with the right skills.

We heard from a number of submitters that the current initial teacher training does not equip teachers adequately for a 21st century learning environment. Some submitters suggested that an important first step would be to require all student teachers to demonstrate proficiency in ICT before they can be approved as teachers. We also heard that for 21st century learning, it will be more important for teachers to be lifelong learners, particularly in relation to digital technologies, and be given greater opportunities for professional learning and development. We heard a number of suggested ways that this could be achieved, such as allowing teachers to select a day per month that they could dedicate to professional learning. Other submitters suggested that teachers be encouraged to undertake professional learning and development in collaborative clusters.

We heard calls for change in initial teacher training. There are a range of skills, knowledge, and understanding to consider, both in terms of the future role of a teacher, and in terms of students in the 21st century. They may cover basic ICT skills, e-learning pedagogy, and specialist discipline knowledge in areas such as computer science and programming. We heard from submitters that teachers are not currently required to meet a basic standard of ICT competency, and are not required to take ICT papers or to understand adequately the pedagogy of digital learning in their training. We believe that these skills will become more important in teaching and learning, and all aspects of the economy and society.

We heard that it is important for the professional development of teachers and initial teacher training to reflect the dynamic nature of the changing digital environment. We heard that on-going professional development is essential for principals and heads of departments. Some submitters feel that all principals should be qualified in digital literacy, and should be required to undertake in-service training to build and maintain these skills. These submitters feel that schools need to be led by principals who understand the importance of digital technology, and can provide leadership in the delivery of blended learning in support of 21st century learning. We consider that boards of trustees should also understand the importance of digital technology, so that they can also provide governance leadership in this area.

Some submitters said that the professional development of teachers should use blended learning, with a combination of online and face-to-face learning, making e-learning and multimedia an integral part of their learning experience. We consider that teacher training

could include the development of skills such as accessing high-quality online material, the judgement to integrate international and New Zealand resources to deliver high-quality learning, and the capability to develop students' information literacy and critical thinking capacities in a digital context.

The digital environment creates many more opportunities for teachers to be innovative. There is an increasing trend in classrooms to move content delivery to collaborative production and problem solving. For example, we heard from a submitter who is creating his own educational podcasts, which he publishes online. This teacher started by making videos for his class, and this has grown almost by accident, so that his videos are now used by students across the country. This has created a large workload, and the teacher has volunteered his time to continue updating the resource. Another example of innovation was given by a science teacher who asked his students to find a way to analyse data in less than the 48 hours taken by a local blood centre. A student in his class developed a method that took only 50 minutes. The blood centre has adopted this method, and dramatically increased its productivity.

We heard that due to the online environment, there are changes occurring in when and how students have access to teachers. We heard this could have implications for teaching time and the sharing of resources.

We heard that librarians have important skills to locate and assess information online. A number of submitters emphasised the increasing importance of this skill for young people in the future.

We heard that for major transformational change to succeed, it is important that there be a focus on both investing in people and technology. Substantial technology investments are being made in the education sector at the moment, such as the rollout of ultra-fast broadband and the Network for Learning. We heard that it is equally important to invest in up-skilling people for 21st century learning. The changes in the way teachers operate will require a sustained investment and commitment by all stakeholders in the education sector. We received advice that the cultural change required could take several decades. We are optimistic that with the right commitment across government, the education sector, and New Zealand society, this could be effected much more quickly. New Zealand needs to ensure we have political consensus on both the vision and commitment to make this change deliver better educational outcomes for our students, now and in the future.

Recommendations

8.	We recommend that the Government consider requiring all New Zealand teachers to demonstrate a defined standard of digital literacy and to undertake professional learning and development to maintain their digital literacy skills, knowledge, and understanding.

9.	We recommend that the Government consider requiring appropriate school leaders to demonstrate a defined standard of digital literacy, and to undertake professional learning and development to maintain their digital literacy skills, knowledge, and understanding.

10.	We recommend that the Government consider measuring and evaluating teacher training institutions on the quality of their digital literacy training.

11.   We recommend that the Government, in consultation with the education sector, consider whether there need to be any policy changes to take into account potential workload changes as a result of online learning.

5   Improving access to New Zealand content online

We are aware that giving students access to technology and communications infrastructure, such as ultra-fast broadband and enterprise wireless networks, is one part of modernising our learning environments. The educational content made available to students is of equal importance.

We heard from a number of submitters the importance of ensuring there is good access to New Zealand content. Specifically, we heard that the teaching resources the Correspondence School uses could be made more accessible in a digital format, and more widely available online.

We heard that more New Zealand content should be made available for students online. We heard that there have been copyright issues relating to content that has already been produced, such as the School Journal archive. Other potential sources of relevant New Zealand content for schools include the National Library, TVNZ archives, the Film Archive, and the Alexander Turnbull library. We heard arguments that this content, originally funded by the taxpayer, should be available free for all schools to access. We heard that, while a lot of this archival content is already online, students and teachers find it challenging to obtain and use, due to a complex range of copyright restrictions. We heard that the result of these restrictions is that the content is not used, or the copyright is not respected. To allow its easy use by students and teachers, changes are needed to the copyright arrangements.

We heard of three licensing schemes administered by the New Zealand School Trustees Association, which provide content that schools can access online. These are the Schools Music licence, which provides audio content to schools, Copyright Licensing, which provides written content, and Screenrights, which provides visual content. We heard that approximately 70 percent of schools hold a licence for print copyrights, but only 25 percent of New Zealand schools hold a Screenrights licence. We heard that mostly higher-decile schools are able to do this, because of the licence fee, which amounts to $4.19 per student per annum. We heard that in other jurisdictions, such as Australia, these costs are covered by central agencies. However, in New Zealand, this cost falls to individual schools. We heard from one submitter their concern that schools may be unaware of their copyright obligations and may have issues with budgeting for licences. We were given an example of a school which was asked to pay $60 per second for footage of a haka from TVNZ.

We heard a submission from an organisation that is already providing online content to the education system about challenges in terms of copyright and licences. Their online teaching tool provides recorded and live videos streamed and downloaded from over 40 domestic and international television channels. It offers access to content provided by educational organisations, companies, foundations, and government departments. Currently any

resource built by New Zealand teachers using a recorded TV programme or any learning guides developed around local productions are not universally available for sharing or purchase by other teachers unless they are in a Screenrights-licensed school. The submitter advocated that the Ministry of Education should consider granting cross-sector licensing. They advocated that this model, with associated funding, could confer a bulk purchase discount, and allow every school equal access to content. We heard that the need for Screenrights licences will only grow as more content becomes available online. We want the Government to consider improving access to digital content.

We also heard that licensing fees are preventing libraries from providing e-books. We heard that e-book technology is still developing. However, we heard that a 21st century learning environment will increasingly use e-books as a major source of teaching resources, and so it is important that access to e-books is not constrained by unaffordable licensing fees.

We heard that under the current copyright licensing arrangements that cover New Zealand schools, certain resources that a teacher develops can become the property of the school's board of trustees, whose express, written permission is required before the resources can be shared. A number of submitters proposed that this could be a large obstacle to collaboration. One submitter suggested that as few as three schools in New Zealand may be operating under a Creative Commons licensing agreement. This submitter suggested that Creative Commons licensing could be adopted as the default setting for schools regarding resource material they create.

We heard from one submitter that it would be redundant for the Ministry of Education, or any other content provider, to replicate existing content, such as certain applications, or educational computer games. For example, mathematics tutorials can be readily used in New Zealand schools. We heard that some games do not translate so easily to the New Zealand context. One example is iCivics, a game which provides information on democracy and social responsibility, and is used in teaching social sciences. This game is based on the American governance system.

We heard that one way to ensure that resources reflect the New Zealand system is to have more New Zealanders producing them. We also heard about the benefits of students themselves generating new resources, as part of their learning. We heard from submitters that it was important to ensure the development of online Māori and Pasifika content and resources.

We heard about the importance of ensuring that there are policies in place to prevent cyber-bullying, and inappropriate online content. We understand the challenges of developing policies in this area. We note that the Law Commission has recently published a report, *Harmful Digital Communications*, and we support the work being undertaken to determine the best response to this issue.

Recommendations

12.   We recommend that the Government consider ensuring that all appropriate New Zealand video content produced for public consumption is licensed and funded under a single national contract, and made available to all schools.

13.   We recommend that the Government ensure that policies and guidance are developed to help prevent cyber-bullying and inappropriate online content.

14.   We recommend that the Government ensure that more local New Zealand content, including Māori and Pasifika content, is made available to all schools, either through the Network for Learning or by other means.

15.   We recommend that the Government ensure that digital educational materials for learning Te Reo Māori are available to all students.

16.   We recommend that the Government consider ensuring access to high-quality digital resources to support the New Zealand curriculum for all teachers and learners.

17.   We recommend that the Government review the intellectual property framework for our education system to resolve copyright issues that have been raised, including considering Creative Commons policy.

18.   We recommend that the Government consider the advantages and disadvantages of whether all documentation produced by the Ministry of Education for teaching and learning purposes should be released under a Creative Commons licence.

6 Development of 21st century skills

We understand digital literacy is framed in a context of knowledge, skills, and understanding in the 21st century. Our schools fulfil many purposes, and digital technology is only one aspect of a learning environment. We recognise that schools provide an enormous opportunity for the development of a range of skills, including digital literacy, social, and non-cognitive skills. These will remain important in a modern world.

One submitter recommended that the definition of digital literacy should be aligned to the skills that will underpin the New Zealand workforce of the future. We acknowledge that NetSafe, in consultation with New Zealand teachers, has produced the following definition of a New Zealand digital citizen. A digital citizen

- is a confident and capable user of ICT

- uses technologies to participate in educational, cultural, and economic activities

- uses and develops critical thinking skills in cyberspace

- is literate in the language, symbols, and texts of digital technologies

- is aware of ICT challenges and can manage them effectively

- uses ICT to relate to others in positive, meaningful ways

- demonstrates honesty and integrity and ethical behaviour in their use of ICT

- respects the concepts of privacy and freedom of speech in a digital world

- contributes and actively promotes the values of digital citizenship.

We acknowledge that this is one definition of the skills that could underpin the New Zealand workforce of the future. We recommend that the Government consider reviewing these skills.

Some submitters suggested that educational computer games should play a larger role in the future of education. We heard that such games can provide a number of benefits, both for the students and for their teachers. Games can provide immediate feedback to children. One of the advantages of an online environment is that there is potential for more people and tools to provide feedback to students. Educational games can also improve students' engagement; we heard that students can become so engrossed in the game that they do not realise that they are learning. Teachers and schools can also benefit from the use of educational games. We heard that one possible advantage can be data provided through software. That data may contribute another source of information about how a student is progressing in a particular curriculum area.

We are aware that the ICT industry in New Zealand is experiencing a significant labour shortage, and that many occupations in the ICT sector are included in the Long-Term Skill

Shortage List prepared by the Department of Labour. We heard from submitters that the future growth and success of the ICT sector will require more students who are excited by, and motivated to pursue, a career in the ICT sector. We are also aware that the report to the Prime Minister by his Chief Science Advisor in 2011, *Looking ahead: science education for the twenty-first century,* describes the challenges involved in delivering science education. These two areas—ICT skills development and science education—will require particular attention to ensure that our future workforce is able to meet the needs of the business sectors that will deliver economic growth in the 21st century.

Recommendations

19.   We recommend that the Government review the definitions of digital literacy to consider a common definition that can be used across the sector.

20.   We recommend that the Government review 21st century skills in the context of digital literacy in our education system.

21.   We recommend that the Government consider research and the potential for a greater role of educational games as part of digital learning environments for 21st century learning and skill development.

22.   We recommend that the Government consider enhancing the role of information science in the education sector.

23.   We recommend that the Government better position ICT skills, knowledge, and understanding as educational options that lead to high-value careers.

7   Equity issues

We heard that issues of equity of access to content and services are not confined to income circumstances. We heard that cost was a major issue for some schools and individuals. However, throughout our hearings, we heard examples of inequity between rural and urban communities, between and within schools, in access to devices, and inequity resulting from the digital literacy of individuals. We heard that both the home and school environment impact on students' ability to be digitally literate.

We heard that public libraries have access to the Internet, but unrestricted access is not provided to users free of charge. We feel that the Government should consider greater public access to the Internet at public libraries, to allow students to continue with study and research after school has officially closed. We recognise that public libraries are funded by local government. Access to the Internet at libraries is also important for adults in the community who are seeking to improve their digital literacy. However, the cost of getting to the library, and time limits on use of the library computer (often only 15 minutes) means that some parents have little chance to improve their own digital literacy.

It is also important to improve adult digital literacy. We were told that the uptake of digital learning increases significantly when parents are involved. We heard from one submitter that they know of 33 early childhood education facilities that are helping children and their parents learn digital literacy skills. We understand that there are many differing views about the provision of digital literacy in early childhood centres. We recommend that the Government undertake research and consider policies in this area.

We also heard that there are benefits from allowing more parents to use the facilities of schools. We heard that schools that offer digital literacy courses on-campus have seen more parents engaging with school. There is anecdotal evidence that parents who complete digital literacy courses are also more likely to engage with the school through other courses.

The 2006 census found that 100,000 families with school-age children did not have computers in their homes. We accept that as a result of the 2013 census we will have more accurate data. We heard from one submitter that they believe a large number of students still do not have access to a computer after school hours. We have advice that while some students do not have access to a computer in their home, they may have access to online learning via another family member or mobile devices. We believe it is important when considering equity of access to online learning, that decisions be based on good data covering a range of indicators including access to computers in homes, access to the Internet, speed of Internet connection, and access to mobile devices among others. Not only may families be limited by lack of access to computers, but we heard an increasing percentage of low-income families no longer have a fixed landline, having switched to prepaid mobile phones to reduce costs. We heard that families that are struggling to pay for a fixed line will not be able to afford broadband access, which will further exacerbate the digital divide.

We heard that this lack of access to online learning could have a detrimental effect on such families' educational opportunities. We heard that many children are involved with the digital up-skilling of their parents.

We heard that parental engagement is fundamentally important to educational outcomes, and that when parents engage with children and their digital devices at home, students are better able to continue their learning outside the classroom. For this purpose after-hours access to the Internet is important. We note that a few schools are seeking to provide free wi-fi within school clusters extending into the homes of local students. We heard that there is an opportunity to learn from these schools' early innovations.

Throughout this inquiry, we sought to understand the extent of the digital divide, but found there was a lack of data or research on it in New Zealand. We also heard of a digital divide within schools, where teachers differ in their approach to the use of digital devices, or leaders embrace digital literacy inconsistently.

We heard of a situation whereby there were only 30 computers available to a class of 31 students, and the disabled student was not assigned one. We believe it is important to ensure that digital learning is inclusive and available to disabled students. We heard from the Human Rights Commission that when education software is being developed, a key point that should be considered is ensuring that people with disabilities can use the software. The commission suggested it is too late to adapt the software when it has reached the market, as students with disabilities will fall behind their classmates while the software gets updated to meet their needs. We were told that some governments have regulations that when technology is designed or procured, it must meet the needs of people with disabilities. We heard that in addition to appropriate software, high-quality broadband is also crucial, so that sign language communication will not be hampered. We also heard that online learning may provide huge opportunities to people who have been traditionally disadvantaged by lack of access to learning.

We heard about problems for students who wish to continue learning outside school because most schools use software which is licensed only for use on the school computers. This prevents students from using the software at home, unless they purchase their own copies. Those whose families cannot afford the licence fee go without. One suggestion from several submitters was to encourage schools to use open-source software. They submitted that this would allow students to use the software on the devices that they bring to school, and can also access the same software on their home computer. We heard from some submitters that there is ample open-source software available to meet all the needs of a student, and some schools already operate solely on open-source software. We recommend that the Government review licensing arrangements for software, in terms of access both in schools and in homes, including open-source software.

Some submitters criticised the prioritization of the current rollout of high-speed broadband, saying that they believe it is targeted at commercial and high-decile areas first. We received advice from the Ministry of Business, Innovation and Employment that there was a fair distribution between deciles in the phasing of the rollout, and that all schools will be connected by 2016.

Recommendations

24.   We recommend that the Government consider introducing policies and initiatives to ensure that every child at school in New Zealand has access to digital learning at school.

25.   We recommend that the Government undertake research and consider policies in relation to digital literacy in early childhood education.

26.   We recommend that the Government undertake to consider how digital learning material used in New Zealand schools can be accessible by people with disabilities, including those who cannot see graphics, cannot hear audio, or cannot operate a mouse.

27.   We recommend that the Government review licensing arrangements for software, so that students have equity of access in schools and in homes, including the use of open-source software.

8   Improving device access

We heard that tools that allow students to improve their digital literacy form an important component of a 21st century learning environment. We heard from a number of submitters that different schools have various device policies, including funding of devices by parents, school funding, and allowing students to bring their own devices. A consistent theme in submissions was the need to focus less on choosing a specific type of device, and more on ensuring that all students have the opportunity of access to both a device and learning content and services. We heard that it is important to establish device policies addressing issues such as equity, funding options, conditions of use, and ease of use, which also recognise the pace of change in technology.

We heard that one of the benefits of using digital devices in schools is that it helps improve the engagement of students in their learning. We also heard from one submitter that this engagement can reduce truancy. One of the issues raised was that some students cannot access, or have difficulty accessing, digital devices in both the home and the school environment. We also heard that some schools have banned devices. We understand that there may be times when it is inappropriate to use a device in the school environment. In chapter 5, we have outlined some of the issues that have been raised regarding safe online environments in our schools. However, we think it is important for schools to ensure that all students have some access to a device for online learning.

Schools are using various funding schemes to enable greater access to devices for students. For example, the Manaiakalani cluster of schools in south Auckland has facilitated a lease-to-own scheme, where families pay an initial deposit of $40 and then $2.50 per week over four years. Another school has established a lease-to-own partnership with a local provider, under which 100 devices were made available for families to purchase. One school noted that their need for leasing-to-own arrangements was substantially reduced when students were allowed to bring their existing devices. In this school only six students, out of an intake of 300, needed to borrow devices from the school, with the rest able to provide their own devices from home. We are pleased to hear that the schools that were early adopters of devices have been used as case studies by other schools. Over 1,000 teachers have visited one school to observe the teaching environment, and see how it could be adapted for their schools. We understand that, given the variation in different communities' access to resources, similar arrangements would not be possible in every school.

We heard suggestions that the Ministry of Education be encouraged to develop procurement policies for devices. This could cover device purchases in bulk, or bulk leasing arrangements, to reduce the cost to parents or schools. We heard from some submitters that it would be unfair to pass on the cost of devices to students and their families, as some might not be able to afford them. Some submitters argued that there should be more government funding of devices.

We heard that there are also issues regarding the security of digital devices. We heard that some students are not taking their devices home, because of security fears; and that students feel more confident to use devices at home if the family feels engaged with the device and the student's learning.

We heard a number of submitters argue that student ownership of devices was more beneficial and delivered better learning outcomes than other arrangements, such as leasing by the school. We also heard that student ownership of devices is correlated with better care of them, and more engagement by families with students' learning. Most of the evidence is anecdotal, however, as these policies are still new, so there has been little time for research. In considering device policy, we believe that the Government needs to consider adequate research into the potential benefits and drawbacks of ownership of devices.

With the predicted increase in the number of devices on a school site, it will become more and more important that schools have good, responsive technical support. As ICT services become more networked, a lot of technical support can be provided remotely using helpdesk services. We had advice that the ICT support role will need to shift to providing more help for students with device issues. We had advice that given the number of devices that may need support in the future, consideration should be given to consolidated helpdesk arrangements.

Recommendations

28.   We recommend that the Government consider introducing a policy that every student have access to a digital device for learning, including the appropriate age for such a policy to apply.

29.   We recommend that the Government consider research and best practice to develop policies on device ownership and other arrangements to ensure students have access to a device.

30.   We recommend that the Government investigate the best bulk supply arrangements to enable possible purchase by families or schools of devices suitable for use by students at school.

31.   We recommend that the Government require schools to establish guidelines on the use of devices at school, based on Ministry of Education guidance, which recognises the value of digital devices for learning.

32.   We recommend that the Government consider how to ensure access to necessary technical support, to ensure the use of ICT in schools is effective.

9   Ultra-Fast Broadband and the School Network Upgrade Programme

We are aware that the Government is implementing a Network for Learning, and that high-speed Internet connectivity is being rolled out to all schools through the Ultra Fast Broadband (UFB) initiative in urban and provincial centres, and through the Rural Broadband Initiative (RBI). Individual schools are also being rewired under the Schools Network Upgrade Programmes (SNUP) to bring their data and electrical connectivity up to date. We want to ensure that these programmes are implemented in a coordinated fashion and given the necessary priority. We note that the Ministry of Education ran a series of "Learning Without Limits" workshops for schools around the country. Necessary infrastructure, technology, and policy need to continue to be rolled out in a coordinated way to realise the intended benefits.

We heard issues raised by submitters about the rollout of the different components of the ICT infrastructure. Some submitters said that SNUP upgrades are not in synch with broadband rollout, and that the planning of the several programmes—urban and rural broadband connections and rewiring of facilities—was not sequenced, so there is no certainty for resource commitment. We heard from the Ministry of Business, Innovation and Employment that this misalignment is to be expected, as the SNUP upgrades started in 2004, whereas the deployment of UFB and the RBI only started in 2011. Since the deployment, the Ministry of Education has been working to align the two programmes.

We note that information on the availability and price of different components of technical infrastructure comes from various government and private-sector sources (the Ministry of Business, Innovation and Employment, Crown Fibre Holdings Ltd, the Ministry of Education, Chorus Ltd as the wholesale provider, and a range of retail service providers). We heard that it can be difficult for schools to get a clear picture of their technical and commercial options. We heard that the provision of accurate and relevant information to schools on the plans for making infrastructure available is critical. The Ministry of Education provides some information for schools, and links to the websites of other parties for more information.

The Ministry of Business, Innovation and Employment provided us with information on the progress of the UFB and RBI programmes, which indicates that fibre is passing the gates of a large number of schools. As at 30 September, 2012, 1,082 schools were passed by fibre, and 14 remote schools were connected using point-to-point wireless connections capable of peak speeds of at least 10Mbps. However, we also heard that the fibre to the gate is just a small part of getting a school connected, which also involves connection from the fibre at the gate to the school buildings, and contracting with a Retail Service Provider (RSP) for the provision of Internet services. We heard that while a number of RSPs have announced plans for schools to connect, they are still at a very early stage of offering other services over new technology. We understand that the Ministry of Education has advised

schools that the Network for Learning, a dedicated broadband network for schools, will be implemented from early 2013, providing access to many of the services that schools will need, so schools should not enter into long-term contracts for services with RSPs in the meanwhile. The ministry's website indicates when some schools can be expected to be connected to UFB/RBI and when they can expect a SNUP upgrade, and provides links to the websites of RSPs. We heard that some submitters feel that there is not a single source of pertinent information for schools.

Schools must negotiate their own contracts with Internet providers. Some submitters commented that their contracts constrained their data use. The Ministry of Education has been helping educate schools in negotiating with Internet service providers, and understanding the contracts, so that they can ensure they are getting what they need. We heard that many schools have not previously needed to negotiate such contracts. We heard from submitters that this was constraining their schools' operating budgets. We feel that the Government should consider arranging these contracts nationally.

We also heard that the SNUP upgrade does not go far enough, as it does not provide hardware to implement wi-fi access in schools. One submitter suggested that the cost of getting wi-fi added to the SNUP upgrade could be as much as $20,000 per school. We heard repeatedly during the inquiry that students will be accessing more and more content online, and using devices, such as tablets and laptops, that are designed to connect through wi-fi connections.

Recommendations

33.   We recommend that the Government consider whether SNUP specifications should include high-quality wi-fi coverage in the upgrades provided to schools.

34.   We recommend that the Government consider accelerating the SNUP programme.

10 Network for Learning

The Government has established Network for Learning Ltd, a Crown-owned company, to govern the operations of the Network for Learning. We understand that the board is still in the establishment phase, determining its scope, role, and areas of focus, and we hope that our observations can be incorporated in its planning. We also understand that the board of Network for Learning Ltd has appointed a chief executive for this organisation.

A number of submitters raised concerns about the rollout of the Network for Learning. We heard uncertainty from submitters about what exactly the Network for Learning is, and what it is designed to achieve, and we understand this uncertainty extends to a number of principals. We note that from July to September 2012, "Learning Without Limits" seminars were held in 24 locations to disseminate greater understanding.

Some submitters believe the Network for Learning is admirable in principle. We heard that it should build on the experience and diversity of current school networks.

Network for Learning Ltd could be well placed to provide leadership in the use of ICT for learning. This might include promoting a national vision for 21st century learning; provision of the appropriate ICT services; communication with all education-sector stakeholders—boards of trustees, principals, teachers, and education sector agencies; support to sector groups to develop 21st century skills and tools; and reviewing the network's services and content annually against stakeholders' needs.

We heard that the Network for Learning should not constrain teachers' and students' access to the vast range of resources available on the Internet. We consider that it is essential that all schools have access to high-speed Internet connection.

Submitters suggested the Network for Learning should also enable teachers to share material easily through the Virtual Learning Network, and incentivise sharing by providing tools for developing and sustaining virtual communities of practice.

Submitters suggested that some core technology components should be provided, funded, and managed on a national basis, rather than assigning the funding and decision rights to school boards of trustees. We heard that ensuring these core components are available to all schools would leave boards of trustees, principals, and teachers free to focus on the use of the technology to deliver 21st century learning. The request for proposal for the Network for Learning lists the core services that will be provided as "internet services, managed firewall services, managed content filtering, managed network services enabling school-to-school connections and school-to-content and service-provider connections, management services, helpdesk services, implementation, and transition." Submitters suggested that these components should all be funded and provided on a national basis, rather than requiring individual schools to make technical and investment decisions that may be outside their expertise.

One submitter was developing a "global log-in identity" so that students could use a single log-in to access content, and move between campuses and teachers without losing access to their e-portfolios. Such a log-in facility is an example of a core ICT service that might be provided nationally on the Network for Learning. We heard that core ICT services to be made available through the Network for Learning could be defined, mandatory for use by all schools, and funded centrally, and that the systems should include, at a minimum, identity and access management, a student management system, a learning management system, e-portfolio, e-asTTle, (an online tool for assessing progress in reading, mathematics and writing) and e-Admin systems such as ENROL, eReturns to the Ministry of Education, and NCEA returns to the New Zealand Qualifications Authority.

We heard that other systems outside the core group could be made available on the Network for Learning for schools to use as they see fit. These systems could also comply with interoperability standards so that schools could use systems and tools seamlessly on the Network for Learning.

We heard that the Network for Learning should be accessible from anywhere, so that students can use virtual programmes from any location—home, marae, church, library, or community centre. We heard that Māori-medium communities in particular should be supported with Māori language menus, content, and resources to allow immersion learners to use the Network for Learning.

We heard from a submitter that the Network for Learning must not only provide raw bandwidth and high-speed Internet connectivity but, equally importantly, the Network for Learning must promote the development of a collaborative community.

Recommendations

35.   We recommend that the Government consider whether the Crown-owned company Network for Learning Ltd be required to actively seek New Zealand content and services for delivery to schools.

36.   We recommend that the Government consider whether the Network for Learning should be accessible not just from schools' premises.

37.   We recommend that the Government consider how Network for Learning Ltd can provide affordable access to high-speed Internet connections with unlimited data to all schools.

38.   We recommend that the Government consider the benefits of implementing and operating a single system for core ICT services in schools, including identity and access management, a student management system, a learning management system, e-portfolio, e-asTTle and e-Admin systems such as ENROL.

39.   We recommend that the Government consider whether access to high-speed Internet and core ICT services should be funded nationally.

11 Institutional arrangements for ICT and 21st century learning

We heard from many submitters that there needed to be greater leadership from the Ministry of Education regarding digital literacy and 21st century learning environments. The Guardians of the Secondary Futures pointed out that their project, which ran from 2004 to 2009, described a 21st century learning environment very similar to themes that have emerged from the submissions to this inquiry, but no policy or legislation resulted from their work. Others commented on the disbanding of the digital learning group within the ministry, the lack of clear and consistent messages from the ministry on digital learning, and the challenge of ensuring that such learning gets the right priority, and does not become "just another programme that schools have to cope with".

We heard about barriers to achieving 21st century learning; submitters argued consistently for shifting the whole education system (policy, legislation, leadership, and measurement) from a competitive to a collaborative model. While there may be no "hard" barriers to collaboration (as evidenced by the fact that some people are already collaborating), we heard from many submitters that the system settings do not actively encourage it.

Submitters argued that leadership is a major factor in how effectively schools embrace 21st century learning, and the schools that are already doing so successfully should be recognised nationally. Some submitters argued that we need a system that analyses better learning pathways, and promotes success stories, so that the pockets of excellence that we heard about throughout the inquiry are not considered out of the ordinary. We recognise that Parliament also has a role in promoting 21st century learning that extends beyond this inquiry.

Submitters told us that strong leadership is needed to develop and promote a vision for learning to all education-sector stakeholders. We heard that a change management program is needed to mobilise and align leaders to increase the pace of change across the sector. We heard that this programme needs to engage and communicate with stakeholders, prepare and equip schools, teachers, and communities, and integrate the rollout of technical components and the building of digital capability in schools. We believe that if this sector-wide change happens, we could see transformational change in the way that students learn and teachers teach.

Submitters expressed serious concerns about the ability of the Ministry of Education to provide the necessary leadership. Submitters expected the ministry to already be taking a much more visible and active leadership role in response to global technology changes in education, and to expectations from and action by the sector.

We understand that there will be a range of stakeholders affected by these recommendations, including parents, students, the wider community, and the education

sector. We believe it will be important to actively engage with these stakeholders to ensure that we maximise learning opportunities in the future.

Recommendations

40.   We recommend that the Government recognise that 21st century learning will require significant change across the education sector, involving a wide range of stakeholders; and that the Government recognise achieving such a change needs government- and sector-wide leadership to develop and promote a vision, and to lead an integrated series of work programmes to implement that vision.

41.   We recommend that the Government consider reviewing the best institutional arrangements for providing the leadership to deliver both digital capability and 21st century learning environments. This review should include options such as, but not limited to, strengthening the Ministry of Education, extending the responsibility of Network for Learning Ltd, or establishing a new Crown entity.

12 Changes to legislation, regulation, and government agency operations

This report indicates that in a number of areas changes to legislation, regulation, and government agency operations could allow a swifter, more seamless change from the current teaching and learning environment to one that better facilitates 21st century learning and digital literacy. We recognise that the scale of changes necessary to achieve this vision is likely to be substantial, and could have implications for the allocation of resources across the sector. The full extent of these implications will depend on the Government's response to our recommendations.

We heard that clusters, networks, and loops of schools are not recognised and cannot be formally assessed by the Ministry of Education or the Education Review Office, and that any moves to establish "federation" or "network" schools face difficulty meeting the ministry's policy guidelines. Submitters described this as another example of the current education system not making the learner the most important consideration. Many submitters proposed a change to the way the ministry assesses schools, so that schools can federate or operate in a network, if that is what will be best for the students. Submitters advocated that this could allow more collaboration between teachers in different schools, without removing accountability.

We heard that any move to form clusters or networks of schools challenges other aspects of the current system, including school governance. In the current system, each school is governed by its own individual board of trustees, which is responsible for setting the direction of the school and identifying goals. Some submitters said that the Education Review Office should also be able to report on schools at a regional level, so that local networks can be assessed in their entirety.

We heard repeatedly that the rules on the use of school property restrict the uptake of contemporary learning techniques and can hamper digital literacy. We also heard of the importance and benefits of improving the community and parents' digital literacy. However, access to Internet-capable devices in some communities is limited. Some submitters told us that school hours and facilities policies need to be changed, to allow better access to the resources for students and the community they serve. These submitters argued that schools should be viewed as "learning hubs", where learning is not restricted to certain hours of the day. If the resources are made available for longer, we feel that the community and students would have a better chance of becoming digitally literate.

We heard of potential opportunities for assessment to be carried out online in the future.

We heard from submitters that addressing these issues might entail changes to the Education Act. Changes that might be considered include changes to hours of school operation; making provision for use of schools for community purposes; conferring power

to direct schools in the use of certain technologies and services; sharing student funding and allocating teachers' time between multiple schools; and changing the role of the board of trustees. Submitters observed the need for a fundamental shift from a competitive to a more collaborative model to underpin any legislative changes to support the vision for 21st century learning.

Recommendations

42.   We recommend that the Government consider that the Education Review Office report on the digital capability of schools in its regular school reviews.

43.   We recommend that the Government consider that the Education Review Office reports include information on how well schools collaborate with other schools.

44.   We recommend that the Government seek input from the sector on barriers to collaboration, and then modify policy, funding, and operational processes to actively promote collaboration.

45.   We recommend that the Government review student assessment to ensure that more online assessment opportunities are realised.

46.   We recommend that the Government consider possible regulations regarding the use of school buildings to support the use of digital facilities by the community.

47.   We recommend that the Government assess the possible resource implications of our recommendations for ICT expenditure.

48.   We recommend that the Government assess possible legislative changes in response to the recommendations in this report.

13 Minority views

New Zealand Labour Party

Closing the digital divide

The New Zealand Labour Party generally supports the thrust of the Inquiry into 21st Century Learning Environments and Digital Literacy. We believe it has been a co-operative and collaborative process and acknowledge the goodwill and intent of all members. We support the bulk of the recommendations.

However, we do not believe the report has gone far enough, and there are a number of matters that we believe need strengthening and highlighting as they are central to addressing the core barriers to achieving equity of access for all New Zealanders to 21st century learning environments and digital literacy.

The New Zealand Labour Party would like to see New Zealand become a leader in the use of digital technology, to help transform New Zealand economically and socially. The future of our nation relies on our children becoming digital Kiwis. In order to realise this future we need to ensure **all New Zealand children have equity of access** to a 21st century learning environment and that all initiatives must be based on this core principle.

Our economic future will increasingly depend on weightless exports. This requires our children to be digitally literate to be future workers in the digital environment. There are compelling reasons to identify and break down any barriers.

The country must not have a digital divide. The New Zealand Labour Party believes some of our greatest innovation can come out of our most deprived areas. Any initiatives to enhance learning in the 21st century and digital literacy, including the new broadband network, must not result in an entrenching of the divide between the haves and the have-nots.

As the majority report concedes, it is estimated (by the most up to date data) that around 20 percent of New Zealand households currently do not have a computer. Computers in Homes (2020 Communications Trust) has estimated that there are 100,000 families with dependent children who do not have access to a computer at home.

These unconnected homes are predominantly in lower socio-economic areas and are often home to Pasifika and Māori families where children are unable to participate equitably in digital learning and using technology. While programs such as Computers in Homes, Computer Clubhouse, and Aotearoa People's Network do great work in increasing digital literacy, their success is sporadic because of limited and uncertain funding.

A key way to increase the connectedness and literacy of many New Zealand households is to leverage the education system by ensuring every child has access to a device. The effects of this absence, given the growing importance of Internet access, needs to be understood.

Clear evidence of harm could justify further interventions to ensure all families have a path towards access that is fair.

The New Zealand Labour Party believes that there are significant inequities between schools in access to high-speed broadband and the digital devices required for students to benefit from a 21st century learning environment. We believe that the report acknowledges some of these inequities but has not adequately addressed the solutions that are entrenching a digital divide. The New Zealand Labour Party believes that they need to be addressed urgently and a comprehensive digital divide strategy is needed.

- We recommend prioritising the funding of systematic research, monitoring, and public reporting into the impacts of the digital age on New Zealanders, in particular the barriers for New Zealanders to access technology, the extent of the digital divide, and how investment can make a difference socially and economically.

- We recommend priority investment and implementation in programmes to ensure equity of Internet access and access to digital devices for New Zealand children at school and at home regardless of their circumstances.

It is already existing New Zealand Labour Party policy to roll out a comprehensive e-learning policy to all Year 7–13 students. In the short term, the decile 1-3 schools and Kura Kaupapa Māori would be targeted as the priority in order to reach those students most vulnerable to disengagement, and most unlikely to have access to a computer at home. This will reduce the "digital divide."

- We recommend that the Government funds access for every student has access to a digital device for learning, including the appropriate age for such a policy.

Other barriers identified in the report include the ability of schools to afford to connect to ultrafast broadband given the existing pressures on their operational budgets.

We heard that services available for schools to achieve the transformation required for 21st century learning environments and digital literacy often depended on the existing abilities of talented individuals in schools, rather than a systematic programme of improvement to school environments, professional development, or to core services and extra resources.

We also heard a consistent level of uncertainty about the proposed Network for Learning and along with the Ministry of Education, the ability for 21st century learning environments and digital literacy to be achieved within the current governance framework. We believe it is critical that:

- The Network for Learning be available to a high degree of public scrutiny and that the ministry's role, capacity, and funding arrangements be closely monitored.

We do not believe that education services can be, nor should be, delivered through the private sector, but that the capabilities of the entities established to deliver the resources and services for 21st century learning utilise the best advice and draw from up to date evidence-based research.

In addition, the report identifies the important role that school libraries and community facilities are to provide learning environments. They are increasingly important as 21st

century learning environments. For many children, and their parents, a community facility may be their only access to the Internet out of school hours. We do not believe the majority report has gone far enough in recognising the important role that school libraries and community facilities play.

- We recommend that the Government consider how school libraries and community facilities can be 21st century learning environments.

- We recommend that the Government enable local government to ensure free Internet access via public libraries for out-of-school learning as a valuable community resource.

We also do not believe the report goes far enough in highlighting the essential role of 21st century learning and digital literacy for preparing our children for careers in the industries of the future on which our economy needs to be based.

We know that ICT skills, knowledge, and understanding are essential for almost all jobs. However, the high-tech industries, and in particular the ICT industries and almost any job upon which contributes to New Zealand's intellectual property is one which will involve digital knowledge.

- We believe stronger career pathways to these jobs must be prioritised in any strategy for 21st century learning and digital literacy.

Finally, we clearly acknowledge the important role that the community plays in ensuring that transformational change can be successful parents in particular must take on board the impact of the 21st century learning environment has on their children's out-of-school home life and the barriers that exist for equity of access.

- We believe that close engagement is necessary between government, the education sector, and the wider community on these issues.

We believe that collaboration means just that, that imposing change on our education system cannot be successful without a high level of community buy-in.

We also note that ironically, despite a high level of support for a collaborative and co-operative education model for 21st century learning in the development of this report, many of the National Government's actual education policies are geared toward competition and erecting barriers to collaboration.

We do not believe that the majority report tackles all of these issues head on. We believe the Government has an important role in showing leadership on this issue. We look forward to the Government's response.

Green Party of Aotearoa New Zealand

The Green Party of Aotearoa New Zealand believes that we have a tremendous opportunity to build on existing innovative work by teachers and schools and move towards greater digital literacy and benefit from 21st century learning environments and education.

This report is a good starting point and contains many recommendations which if enacted would better position New Zealand's education system for the 21st century and deliver enhanced educational outcomes. It is essential that the changes are consulted widely with stakeholders such as students, parents, boards of trustees, educational unions, and communities if they are to be supported and implemented successfully. In particular, there must be consultation with the sector if there are any structural changes affecting working hours and/or off-site responsibilities of teachers that arise from this report.

Leadership is required at the Government and Ministry of Education level but also a acknowledgment that innovation will not always be "top-down" and there is a need to encourage ideas to come from teachers and schools.

This report lacks strong recommendations to the Government to provide the leadership and implement actions needed at this point in time. In many cases the Green Party of Aotearoa New Zealand believes that the Government needs to go further than just "consider" numerous recommendations in this report, and would prefer actions to be implemented.

At the highest level, the Green Party of Aotearoa New Zealand heard from many submitters that what was needed was a fundamental change away from the current competitive model that sees schools in competition against one another and recommends a move to a more collaborative model. A collaborative school model could better share innovations and best practices amongst teachers and schools to the students' benefit. The success of 21st century learning relies on an equitable education system and teachers who can facilitate a strategic use of the technology to enhance student learning. It is less about devices than effective relationships and good use of tools.

This report contains many recommendations and it is important that the Government acknowledge the financial implications required and appropriately fund the initiatives if we are to realise the benefits of 21st century learning. For example individual digital devices are desirable in some circumstances and if some New Zealand children are not to miss out, it is essential that financial support is available to ensure that they are affordable for families. Bulk purchase to reduce costs is a common sense step but the Government must enact policies to give a range of ownership or purchasing options.

Schooling and education cannot be taken in isolation from the community and more must be done to "bridge the digital divide" in general if some students are not to be left behind from 21st century learning. The Green Party of Aotearoa New Zealand would recommend that the Government develop a national digital divide strategy with practical initiatives such as ensuring that all public libraries ensure free Internet access. In many libraries this is already the case, supported by Government funds and this is consistent with the U.N. Special Rapporteur's recent Internet access report. The Green Party of Aotearoa New Zealand also recommends greater funding to the Computer Clubhouses and Computers in Homes programmes currently providing computer and Internet access so that it can reach a greater number of households and communities.

Likewise the Government must ensure access for students with disabilities. Recommendation 26 only requests a consideration of these issues. However the Green

Party of Aotearoa New Zealand member believes including disability-accessible materials and versions of materials is a must to ensure equality of access.

The Green Party of Aotearoa New Zealand supports improving public access to ICT through supporting the establishment of community technology hubs in schools, tertiary institutions, public libraries, and other community centres. This will require appropriate investment in installing hardware and software, as well as providing ICT training.

The Green Party of Aotearoa New Zealand member believes providing all educational materials produced in New Zealand schools under a Creative Commons license would harness and greatly spread innovation and best-practice teaching. We would recommend that the Government investigate this with the goal of achieving it.

The Green Party of Aotearoa New Zealand supports the intent of this report towards greater utilisation of digital tools and a transformational change to 21st century learning in New Zealand.

Appendix A

Committee procedure

The committee called for public submissions on the inquiry. The closing date for submissions was 11 May 2012. The committee received 90 submissions from the organisations and individuals listed in Appendix B and the committee heard 55 of the submissions orally. The committee heard evidence in Wellington and Auckland. The committee met between 9 May 2012 and 12 December 2012 to consider the inquiry.

Committee members

Nikki Kaye (Chairperson)
Clare Curran
Catherine Delahunty
Hon Jo Goodhew
Colin King
Hon Nanaia Mahuta
Tracey Martin
Sue Moroney
Simon O'Connor
Scott Simpson

Gareth Hughes replaced Catherine Delahunty for this item of business

Appendix B

List of submitters

2020 Communications Trust
Aegility eLearning Services
Alan Cooper
Amesbury School
Association of Proprietors of Integrated Schools
Association of Public Library Managers
Auckland Libraries
BEST Pacific Institute of Education
CantaNet
Carolyn Stuart
Catalyst IT
Chris Clay
City of Manukau Education Trust (COMET)
ClickView New Zealand
Committee for Auckland
Computer Clubhouse Trust
CORE Education
Darren Zhang
Digital Media Group, University of Canterbury
Distance Education Association of New Zealand
Dr David Parsons
Dr Hilary Stace
Dr Stanley Frielick
Early Childhood Council
Education Television and Video Communication Trust (eTV)
Edwin McRae
Egressive
Epsom Girls Grammar School
Ernie Newman
Frances Valentine
Google
Greater Christchurch Schools Network
Guardians of Secondary Futures
Human Rights Commission
Ian Mitchell
Institute of Technology and Polytechnic Library Managers
Interim Tamaki Transformation Board
Kate Shevland
Kylie Hickey
Learning Media
Library and Information Association of New Zealand Aotearoa
Louise Starkey

Maharishi Foundation
Manaiakalani Cluster of Schools
Mark Brown
Mark Osborne
Microsoft New Zealand
Nat Torkington
National Council of Women of New Zealand
NetSafe
Network for Learning
New Zealand Council for Educational Research
New Zealand Post Primary Teachers' Association
New Zealand School Trustees Association
New Zealand Superloop Forum
New Zealand Teachers Council
Orewa College
Paul Seiler
Pinelopi Zaka
Professor Sir Peter Gluckman
Publishers Association of New Zealand and Copyright Licensing
Quality Public Education Coalition
Robin Ohia on behalf of the Virtual Learning Network Council and the Greater Wanganui
Education Network Committee
Room 15 Tawa Intermediate
Rosemary Nisbet
Royal New Zealand Foundation of the Blind
Royal Society of New Zealand
School Libraries Association of New Zealand Aotearoa
Screenrights
Sonny Teio
Stephanie Thompson
Stephen Lethbridge
Stephen Marshall
Sue Davidson
Sue Parkes, Murray Spackman, Roger Hynd, and Wayne Duncan
Tara Taylor-Jorgensen
Te Aho o Te Kura Pounamu
Te Totara Primary School
Telecom New Zealand
Tim Kong
Tuakiri, New Zealand Access Federation
Unitec Library
University of Canterbury e-Learning Lab
University of Waikato
Virtual Learning Network Primary
Vodafone New Zealand
Waikato Institute of Technology
Waikirikiri School Board of Trustees
Wanganui District Council's Digital Leaders Forum
WiFi Guys